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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/812,066

03/30/2004

Michael Walker

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EXAMINER

LEE, PING

ART UNIT

PAPER NUMBER

2615

MAIL DATE

DELIVERY MODE

01/24/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/812,066

Applicant(s)

WALKER, MICHAEL

Examiner

Ping Lee

Art Unit

2615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/30/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of species II, Fig. 5 in the reply filed on 10/23/07 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claim 10 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/23/07.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1-9, 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, lines 1-2, the phrase "in particular speech" is vague and indefinite. Lines 9-10, the phrase "in particular with reduced echo and/or reduced reverberation compared to the received acoustic signal" has a similar defect.

Claims 3, 9 and 12 have similar language; therefore, they are vague and indefinite.

Regarding claim 4, line 2, " $n \in \mathbb{N}$ " is vague and indefinite because it was not defined.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 11 and 12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 11 or claim 12 specifies two statutory classes, a process and a machine. It is improper to claim an invention including two statutory classes.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5, 8 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Tazawa et al (hereafter Tazawa) ("A Fully Passive Echo-Canceler using a Single Microphone).

Regarding claims 1 and 11, Tazawa discloses a method and an apparatus for enhancing the quality of a received acoustic signal, in particular speech signal

("INTRODUCTION"), wherein the received acoustic signal has been generated by a single microphone (abstract), wherein the received acoustic signal is subjected to an analysis of characteristics, wherein the analysis is used to estimate one or more virtual microphone signals (e.g. echo 1, echo 2), which are parts of the received acoustic signal, and the one or more virtual microphone signals are used to generate an enhanced quality acoustic signal ($s'(t)$) as defined in equation 7), in particular with reduced echo and/or reduced reverberation compared to the received acoustic signal.

Regarding claim 2, Tazawa shows the steps

a) the received acoustic signal is subjected to an analysis detecting the time period $d1$ ($\tau1$) between direct sound and the onset of reverberation sound within the received acoustic signal,

b) a delay signal is generated by delaying the received acoustic signal by the time period $d1$ ($s(t - \tau1)$),

c) a modified delay signal is created by modifying the delay signal applying a set of modification parameters ($A1$),

d) a first virtual microphone signal is generated by subtracting the modified delay signal from the received acoustic signal (equation 3),

e) the first virtual microphone signal is subjected to an analysis generating one or several analysis parameters (the iterative search performed using the four steps specified between two columns on p. 1192), and

f) the modification parameters are adapted within a feedback loop "see "Minimization of Effective Signal Length"), optimizing the analysis parameter, in particular minimizing the overall amplitude of the first virtual microphone signal.

Regarding claim 3, the claimed amplifying the level of the first virtual microphone signal reads on the coefficient A1.

Regarding claim 4, Tazawa shows that more than one echo is canceled using the steps.

Regarding claim 5, Tazawa shows the steps of adding (the summation in equations), the undelayed microphone signal is the original one.

Regarding claim 8, Tazawa shows the Fourier transform and frequency domain (p. 1192).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 6, 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tazawa.

Regarding claim 6, Tazawa fails to show a FIR unit. However, based on Tazawa's teaching, the enhanced audio signal is generated by calculation involving delay, multiplication and summation. One skilled in the art recognized that such

calculation could be performed by FIR filter. Examiner takes Official Notice that this feature is notoriously well known in the art. Thus, it would have been obvious to one of ordinary skill in the art to modify Tazawa by implementing the calculation using well known FIR filter in order to obtain the enhanced audio signal.

Regarding claim 7, Tazawa fails to show a least mean square method and/or a normalized least mean square method. However, based on Tazawa's teaching, one has to minimize the difference between estimate amplitude A' and the actual amplitude A . One skilled in the art recognized that such calculation could be performed by a least mean square method and/or a normalized least mean square method. Examiner takes Official Notice that this feature is notoriously well known in the art. Thus, it would have been obvious to one of ordinary skill in the art to modify Tazawa by utilizing a least mean square method and/or a normalized least mean square method in order to obtain the best amplitude A' for calculating the enhanced audio signal.

Regarding claim 12, Tazawa fails to explicitly show a computer terminal. However, Tazawa teaches a simulation performed using a male voice. The data analysis is performed and the graphs are shown. The analysis involves the cepstrum which is best performed using a computer. Therefore, it would have been obvious to one of ordinary skill in the art to modify Tazawa by using a computer to perform the simulation in order to determine how effective the echo and/or reverberation being canceled.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tazawa in view of Dear et al (hereafter Dear) (US 4,832,147).

Regarding claim 9, Tazawa teaches how to measure the time delay in Fig. 1 by observing the edge of the signal amplitude following a timer period of substantially constant signal amplitude. However, Tazawa fails to explicitly show the limited frequency interval. Tazawa teaches that echo and/or reverberation in a stadium would make it difficult to distinguish speech ("INTRODUCTION"). Dear teaches that, without echo cancellation, the intelligibility of an audio signal at 100Hz inside a gymnasium is unacceptable (col. 3, lines 37-48). Thus, it would have been obvious to one of ordinary skill in the art to modify Tazawa in view of Dear to measure the time delay at 100 Hz in order to design the echo cancellation for reducing the echo in a gymnasium or other similar enclosure.

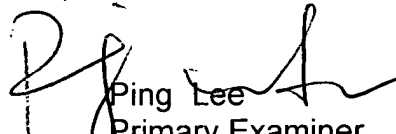
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 571-272-7522. The examiner can normally be reached on Monday, Wednesday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian C. Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Ping Lee
Primary Examiner
Art Unit 2615

pwl